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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/764,149	01/23/2004	Mark L. La Forest	H0006156-1160	8154

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EXAMINER	
WOLLSCHLAGER, JEFFREY MICHAEL	
ART UNIT	PAPER NUMBER
1732	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/16/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/764,149	FOREST ET AL.	
	Examiner	Art Unit	
	Jeff Wollschlager	1732	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 February 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *9,12 and 15-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *9, 12 and 15-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 29, 2006 and February 2, 2007 has been entered.

Response to Amendment

Applicant's amendment to the claims and specification filed December 29, 2006 has been entered. Claims 1-8, 10, 11, 13, 14 and 18 have been canceled. Claims 9 and 17 are currently amended. Claims 9, 12 and 15-17 are pending and under examination.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 9, 12 and 15-17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Regarding claims 9 and 17, upon a new reading of the claims, the limitation, "subjecting said materials in said constraint fixture

to densification" is unclear as to its limiting effect. The limitation does not make it positively clear that the compacted material remains in the constraint fixture during the densification step. In accord with the prosecution history up to this point, the limitation is understood to be, "subjecting said compacted fibrous materials while still contained within said constraint fixture to densification as a unit". Appropriate clarification to the claim language is required.

Regarding claim 17, the limitation, "heating the mold" is indefinite because it is unclear to which mold reference is being made. It is unclear whether this mold is the initial "mold apparatus" recited in the claim or the mold in which resin transfer molding takes place or if it refers to the mold constraint fixture. For the purposes of examination the limitation is understood to refer to the mold in which resin transfer molding takes place as this appears to be the intended scope of the claim (Instant specification 2005/0093188 paragraphs [0043; 0046-0047]).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 9, and 12, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hecht (U.S. 5,654,059) in view of Bauer (U.S. 3,991,248).

Regarding claim 9, Hecht teaches a method of manufacturing a preform for brake friction components (col. 7, lines 20-21) comprising: placing carbon fibers comprising loose fibers in the absence of binders (col. 4, lines 55-61; col. 5, lines 43-48) into a constraint fixture having a bottom plate (col. 14, lines 54-56), and an internal area corresponding in shape to the shape of the desired preform (col. 4, lines 55-62; col. 7, lines 21-24), with the internal area being defined by flat faces/plates (col. 7, line 23) that are perforated (col. 7, lines 28-34) and annular (col. 7, lines 21-24) including a perforated annular ejector/stripper plate (col. 15, lines 10-14) and a perforated annular top plate/closure (col. 7, lines 28-33) with an inner and outer wall (col. 14, lines 54-56), compressing/compacting the carbon fiber material with a needle press to form a fibrous matrix (col. 10, lines 57-60; col. 11, lines 10-13), and subjecting the material in the constraint fixture to further densification by one or more of carbon vapor deposition , resin transfer molding, or resin or pitch infiltration (col. 9, lines 63-col. 10, line 8; col. 12, lines 49-51; col. 15, lines 21-25; col. 15, lines 67-col. 16, line 5).

Hecht teaches the loose fibers are produced from chopped tow (col. 6, lines 21-22). The tow is sprayed/flows in a continuous stream into the constraint fixture (col. 6, lines 46-64; col. 7, lines 41-47).

Hecht does not teach pressing at a pressure of about 3-10 atmospheres. Additionally, Hecht does not expressly state that the constraint fixture is removed from the mold apparatus/needle press prior to subjecting the material in the constraint fixture to further densification, but only that that the mold may be fitted with a removable

closure (col. 7, lines 28-39). However, Hecht does teach manufacturing preforms of different densities (col. 13, lines 41-45) and different thicknesses (col. 9, lines 6-10).

Bauer discloses in an analogous method of producing fiber reinforced composite materials employment of a portable constraint fixture/compression fixture that is adjusted to accurately control the density and thickness by an adjusting/molding apparatus, (Figure 14; Figure 6; Figure 1; col. 2, lines 65-col. 3, line 7; col. 5, lines 16-20; col. 7, lines 6-35) by compressing the material to form a shaped substrate/preform of optimum fiber volume and density (col. 8, lines 15-33) and then placing the preform/substrate while it is still held by the fixture into a furnace for densification (col. 11, lines 19-42) which intrinsically involves removing it from where the adjusting process took place prior to placement in the furnace.

Therefore it would have been *prima facie* obvious to one having ordinary skill in the art at the time of the claimed invention to employ a compressing/constraining fixture such that the preform/substrate is held by the fixture during movement between processing steps such as is disclosed by Bauer in the method disclosed by Hecht for the purpose as disclosed by Bauer and suggested by Hecht (col. 7, lines 16-40) of employing a fixture that promotes production of a part having tight density and physical dimension tolerances with appropriate strength (Bauer: col. 1, lines 26-35) by accurately constraining the substrate/preform to its formed configuration (Bauer: col. 3, lines 15-17). Additionally it is noted that the density and thickness of the article compressed in the fixture are impacted by the chosen compression pressure. As such, one would have to take all of these variables into consideration when determining the pressure at

which to compact the fibers. As such, the pressure would have been readily optimized as is routinely practiced in the art.

As to claim 12, Hecht teaches placing a veil/scrim/perforated foam sheet into the mold cavity (col. 7, lines 30-33; col. 14, lines 4-5).

As to claim 15, Hecht teaches the brake friction component preform is configured as a brake for a disc brake for an aircraft (col. 1, lines 45-47).

As to claim 16, Hecht teaches the mold apparatus comprises a locking means (col. 15, lines 10-15) for maintaining the top plate in place in the constraint fixture. Further, the method of Hecht implicitly includes a means for lifting the constraint fixture out of the mold apparatus/needle press.

Claims 9, and 12, 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Snyder (U.S. 5,686,117) in view of Bauer (U.S. 3,991,248).

Regarding claim 9, Snyder et al. teach a method of manufacturing a preform for brake friction components (col. 1, lines 10-17) comprising: placing carbon fibers comprising loose fibers in the absence of binders (col. 3, lines 52-55; col. 3, line 65 - col. 4, line 2) into a constraint fixture having a bottom plate (Figure 2, element (48)), and an internal area corresponding in shape to the shape of the desired preform (Figure 2, element (60)), with the internal area being defined by annular perforated plate including an ejector/separator plate and a top/separator plate, an inner wall, and an outer wall in a mold apparatus (Figure 2, elements (58), (62), (56), and (24)), chopping continuous fiber tow to produce loose materials and spraying/dispensing carbon fiber materials into

said dispenser (col. 3, lines 36-55); compressing the carbon fibers to form a fibrous matrix (col. 6, lines 7-9), removing the constraint fixture from the mold apparatus (col. 6, lines 9-10; col. 6, lines 14-16; col. 5, lines 25-27 – hydraulic or pneumatic compression means of the constraint fixture is included as part of the mold apparatus), and subjecting the materials in the constraint fixture to densification by one or more of resin transfer molding resin or pitch infiltration of carbon vapor deposition (col. 4, lines 24-28; col. 6, lines 14-16). It is further noted that Snyder et al. teach that it is preferable, but not required, to remove the separator plates prior to densification. Snyder et al. do not teach employment of a perforated ejector plate comprising perforations in the area upon which the carbon fiber material is placed.

However, Bauer discloses in an analogous method of producing fiber reinforced composite materials employment of a portable constraint fixture/compression fixture that is adjusted to accurately control the density and thickness by an adjusting/molding apparatus, (Figures 14; Figures 6; col. 2, lines 65-col. 3, line 7; col. 5, lines 16-20; col. 7, lines 6-35) by compressing the material to form a shaped substrate/preform of optimum fiber volume and density (col. 8, lines 15-33) and then placing the preform/substrate while it is still held by the fixture into a furnace for densification (col. 11, lines 19-42) which implicitly involves removing it from where the adjusting process took place. The compression fixture utilized by Bauer employs perforated plates upon which carbon fiber material is placed in order to facilitate circulation of the densifying material.

Therefore it would have been *prima facie* obvious to one having ordinary skill in the art at the time of the claimed invention to employ a compressing/constraining fixture with a plurality of perforations such as that employed by Bauer in the method disclosed by Snyder for the purpose, as disclosed by Bauer, of employing a fixture that promotes production of a part having tight density and physical dimension tolerances with appropriate strength (col. 1, lines 26-35) by accurately constraining the substrate/preform to its formed configuration (col. 3, lines 15-17). Additionally it is noted that the density and thickness of the article compressed in the fixture are impacted by the pressure employed. As such, one would have to take all of these variables into consideration when determining the pressure at which to compact the fibers. As such, the pressure would have been readily optimized as is routinely practiced in the art.

As to claim 12, Bauer discloses sheets of carbon material surrounding loose fibers within the fixture. These sheets intrinsically function as a veil (Figure 4).

As to claim 15, Snyder et al. teach the brake friction component is configured as an aircraft landing system brake (col. 1, lines 10-17).

As to claim 16, Snyder et al. teach locking means to maintain the top plate in place in the constraint fixture (Figure 2, elements (64), (50), (70), and (72)). Further, the method implicitly includes a means for lifting the constraint fixture out of the mold apparatus since Snyder et al. teach transporting the constraint fixture through subsequent unit operations.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Snyder (U.S. 6,183,583) in view of Ockers (U.S. 2003/0214081).

Regarding claim 17, Snyder et al. teach a method of manufacturing a preform for brake friction components (col. 1, lines 10-17) comprising: placing carbon fibers comprising loose fibers in the absence of binders (col. 3, lines 52-55; col. 3, line 65 - col. 4, line 2) into a constraint fixture having a bottom plate (Figure 2, element (48)), and an internal area corresponding in shape to the shape of the desired preform (Figure 2, element (60)), with the internal area being defined by annular perforated plates including an ejector/separator plate and a top/separator plate, an inner wall, and an outer wall in a mold apparatus (Figure 2, elements (58), (62), (56), and (24)), compressing the carbon fibers to form a fibrous matrix (col. 6, lines 7-9), removing the constraint fixture from the mold apparatus (col. 6, lines 9-10; col. 6, lines 14-16; col. 5, lines 25-27 – hydraulic or pneumatic compression means of the constraint fixture is included as part of the mold apparatus), and subjecting the materials in the constraint fixture to densification by one or more of resin transfer molding, (col. 4, lines 24-28; col. 6, lines 14-16). It is noted that the separator plates taught by Snyder et al. that form the ejector and top plate are annular. As such, these plates have one perforation in the center. It is further noted that Snyder et al. teach that it is preferable, not required, to remove the separator plates prior to densification. It is further noted that the recitation in Snyder et al.: "impregnation of resin...is employed to densify the preform" (col. 4, lines 25-27) is understood to be resin transfer molding.

Snyder does not expressly disclose the claimed temperature conditions. However, Ockers discloses that it is known in the art of producing composite materials by resin transfer molding to place the preform in the mold and to preheat the mold, and thus the preform with it, as needed for the application to aid in resin flow (paragraphs [0006 and 0017]).

Therefore it would have been *prima facie* obvious to one having ordinary skill in the art at the time of the claimed invention to preheat the preform and heat the mold as claimed within the resin transfer molding process disclosed by Snyder by heating the mold, and the preform with it prior to the injection of resin as suggested by Ockers for the purpose of improving resin flow in the mold, as is routinely practiced in the art. Regarding the specifically claimed temperatures, Ockers discloses the heating is performed as needed for the application (paragraph [0006]) and thus would have been readily optimized as is routinely practiced in the art. Additionally, the examiner notes MPEP section 2144.05 II regarding the patentability of temperature differences:

"Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical."

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hecht (U.S. 5,654,059) in view of Bauer (U.S. 3,991,248) and Ockers (U.S. 2003/0214081).

Regarding claim 17, Hecht teaches a method of manufacturing a preform for brake friction components (col. 7, lines 20-21) comprising: placing carbon fibers comprising loose fibers in the absence of binders (col. 4, lines 55-61; col. 5, lines 43-48)

into a constraint fixture having a bottom plate (col. 14, lines 54-56), and an internal area corresponding in shape to the shape of the desired preform (col. 4, lines 55-62; col. 7, lines 21-24), with the internal area being defined by flat faces/plates (col. 7, line 23) that are perforated (col. 7, lines 28-34) and annular (col. 7, lines 21-24) including a perforated annular ejector/stripper plate (col. 15, lines 10-14) and a perforated annular top plate/closure (col. 7, lines 28-33) with an inner and outer wall (col. 14, lines 54-56), compressing/compacting the carbon fiber material with a needle press to form a fibrous matrix (col. 10, lines 57-60; col. 11, lines 10-13), and subjecting the material in the constraint fixture to further densification resin transfer molding (col. 9, lines 63-col. 10, line 8; col. 12, lines 49-51; col. 15, lines 21-25; col. 15, lines 67-col. 16, line 5).

Hecht teaches the loose fibers are produced from chopped tow (col. 6, lines 21-22). The tow is sprayed/flows in a continuous stream into the constraint fixture (col. 6, lines 46-64; col. 7, lines 41-47).

Hecht does not expressly state that the constraint fixture is removed from the mold apparatus/needle press prior to subjecting the material in the constraint fixture to further densification, but only that that the mold may be fitted with a removable closure (col. 7, lines 28-39).

However, Bauer discloses in an analogous method of producing fiber reinforced composite materials employment of a portable constraint fixture/compression fixture that is adjusted to accurately control the density and thickness by an adjusting/molding apparatus, (Figures 14; Figures 6; col. 2, lines 65-col. 3, line 7; col. 5, lines 16-20; col. 7, lines 6-35) by compressing the material to form a shaped substrate/preform of

optimum fiber volume and density (col. 8, lines 15-33) and then placing the preform/substrate while it is still held by the fixture into a furnace for densification (col. 11, lines 19-42) which intrinsically involves removing it from where the adjusting process took place.

Therefore it would have been *prima facie* obvious to one having ordinary skill in the art at the time of the claimed invention to employ a compressing/constraining fixture such that the preform/substrate is held by the fixture during movement between processing steps as disclosed by Bauer in the method disclosed by Hecht for the purpose as disclosed by Bauer and suggested by Hecht (col. 7, lines 16-40) of employing a fixture that promotes production of a part having tight density and physical dimension tolerances with appropriate strength (Bauer: col. 1, lines 26-35) by accurately constraining the substrate/preform to its formed configuration (Bauer: col. 3, lines 15-17).

Additionally, Ockers discloses that it is known in the art of producing composite materials by resin transfer molding processes to place the preform in the mold and to preheat the mold, and thus the preform with it, as needed for the application to aid in resin flow (paragraphs [0006 and 0017]).

Therefore it would have been *prima facie* obvious to one having ordinary skill in the art at the time of the claimed invention to preheat the preform and heat the mold as claimed within the resin transfer molding process disclosed by Hecht by heating the mold, and the preform with it prior to the injection of resin as suggested by Ockers for the purpose of improving resin flow in the mold, as is routinely practiced in the art.

Regarding the specifically claimed temperatures, Ockers discloses the heating is performed as needed for the application (paragraph [0006]) and thus would have been readily optimized as is routinely practiced in the art. Additionally, the examiner notes MPEP section 2144.05 II regarding the patentability of temperature differences:

"Generally, differences in concentration or temperature will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration or temperature is critical."

Response to Arguments

Applicant's arguments with respect to claims 9, 12 and 15-17 have been considered but are moot in view of the new ground(s) of rejection. However, in response to applicant's argument, regarding claim 17, that it is clear that perforated in the claim means having perforations (emphasis added) rather than having a single perforation, the examiner notes that the features upon which applicant relies (i.e., perforations) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

For example, a fixture merely having a raised/embossed central portion that has not been perforated would thus be an annular non-perforated fixture. As such, the examiner maintains that the interpretation applied regarding the Snyder reference teaching a perforated annular ejector plate in the previous rejection of claim 17 and in the instant rejection of claim 17 under Snyder in view of Ockers is proper.

The examiner notes that the amendment to claim 9 has appropriately and clearly clarified the scope of the perforated ejector plate to include perforations in the area upon which the carbon fibers are placed and that this limitation does not appear to be taught by Snyder. Applicant is encouraged to clarify the scope of claim 17 accordingly to overcome the rejection of Snyder in view of Ockers.

Conclusion

All claims are rejected.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeff Wollschlager whose telephone number is 571-272-8937. The examiner can normally be reached on Monday - Thursday 7:00 - 4:45, alternating Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on 571-272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JW

Jeff Wollschlager
Examiner
Art Unit 1732

April 3, 2007

CHRISTINA JOHNSON
SUPERVISORY PATENT EXAMINER
4/12/07